

ABSTRACT OF THE DISCLOSURE

A proportionally-controllable solenoid including primary and secondary pole pieces that surround an armature axially movable along an axial channel within the pole pieces. The pole pieces are separated axially by an air gap and are conically tapered toward the gap. The leading and trailing faces of the armature are substantially orthogonal to its direction of travel to minimize radial parasitic forces on these faces. Further, the armature is also lengthened such that the trailing face is always outside the axial channel in the secondary pole piece at all points of axial travel to minimize the pull-back effect of axial flux vectors on the trailing face.

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